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able; 3 deaths; 1 case of yellow fever; prevailing disease, malarial fever; general sanitary condition of this port and the surrounding country during the week, infected. The case of yellow fever was removed from steamship *Ellis* on August 26, 1905, for observation; was thoroughly screened in the United Fruit Company's hospital. Diagnosis of yellow fever confirmed August 29, 1905.

Bills of health were issued to the following-named vessels:

Date.	Vessel.	Destination.	Number of crew.	Number of passengers from this port.	Number of passengers in transit.	Pieces of baggage.
Aug. 26	Ellis .....	Mobile .....	34	0	0	0
30	Hispania.....	do .....	21	0	0	0
31	Fort Morgan .....	do .....	25	0	0	0
Sept. 1	Colombia .....	do .....	20	0	0	0

### *Yellow fever on steamship Preston.*

The Norwegian steamship *Preston*, of the United Fruit Company Line, arrived in this port September 5, 1905, about 7 p. m., from the Mississippi River quarantine station.

The following morning I visited the vessel and found she had some sick members of the crew. Two of the cases were decidedly suspicious as being yellow fever. On the afternoon of the 7th I asked Doctor Jumel to visit the ship with me to complete the diagnosis of 5 men reported sick. All undoubtedly have yellow fever. When we had concluded the examination it was too late to remove the men from the ship, but arrangements were made to take them off the next day and isolate them in the United Fruit Company's hospital. At the same time a simultaneous fumigation of the whole ship was made by me. I remained on board for two hours during the fumigation, so that I might know that it was thoroughly done.

The manager here says that he wishes to hold the ship for ten days. I will visit her morning and evening and at the expiration of five days will fumigate again, and this will again be repeated when another five days have passed, unless there should be further developments which would change the dates to correspond to the period of last infection.

By the next steamer I will forward a complete report regarding this ship.

### *Report on plague at La Boca, and the measures taken to eradicate the disease.*

By Surg. J. C. PERRY.

Plague had become so widely disseminated in the ports to the south having intimate and frequent commercial communications with Panama, that the occurrence of a case of the disease at La Boca was what had been feared for the past six months.

Plague is the most insidious of the quarantinable diseases in its approach, and the possibility of this infection passing in various ways through any port, no matter how stringent the quarantine regulations may be, must be admitted. As long as commercial relations with plague-infected ports are allowed, and commerce demands this intercourse, we must admit the possibility of infection being introduced

and must be prepared to deal with it. No quarantine that allows commercial relations with badly infected plague centers will afford absolute protection.

The utmost that can be accomplished is to enforce stringent regulations at port of departure, supplemented at ports of entry by such measures as will afford the most complete protection. If we refuse to receive ships and cargo from plague-infected ports the quarantine procedure is simple and the protection is absolute, but such a course is neither scientific nor rational quarantine. Commerce must be considered and the question of how plague is generally introduced as bearing on the treatment of ships and cargo from infected centers so as to minimize the danger to ports to which they go, must naturally be considered.

Panama occupies a different commercial position from most ports in Central and South America. It is a gateway for the commerce of many countries, and the closing of this port would be far reaching in its paralyzing effect. Therefore the duty devolves on the quarantine officers here to protect Panama against the introduction of the most dangerous of the quarantinable diseases in its effects and at the same time permit commerce with as little delay and interference as is consistent with safety. The responsibility of this position is great and is one that requires the most accurate consideration of facts, dangers, and possibilities.

In this connection it may be pertinent to state the measures that have been enforced for the past year to afford protection to this port.

Every precaution has been taken to prevent the introduction of plague and other quarantinable diseases. All ships have been disinfected at Callao, under the supervision of an officer of the Public Health and Marine-Hospital Service, for the purpose of killing rats and vermin. All baggage that was regarded with suspicion has been disinfected, and the passengers and crew have been rigidly inspected. All persons who presented any symptoms suspicious of an infectious disease have been removed from the ship or denied passage. Cargo, which is one of the most potent factors in introducing plague, has received careful attention, and all that was considered dangerous has been refused shipment, and, if brought, has been sent back from this port without being allowed to land.

Again, Public Health and Marine-Hospital Service inspectors travel on the vessels between Callao and Payta, supervising and inspecting the personnel of the ship and the passengers and cargo taken on at the intermediate ports. Finally, the ship is again disinfected at Guayaquil under the supervision of a Service officer; and the vessel is subjected to a rigid inspection on arrival here, at times redisinfect, and all passengers that have not completed the period of incubation of plague and yellow fever are held in quarantine until such is the case.

Now the question naturally arises, How did plague gain an entrance and how did the La Boca wharf become infected? It can safely be stated that the disease was introduced either by infected rats or infected cargo, but which factor it is difficult to accurately determine. I know positively that persons suffering with the disease were not the cause, and I firmly believe that infected baggage can not be held responsible.

An examination of the facts in the case may throw some light on the subject. The rats on the wharf became infected when the case was

reported, June 22, as suspicious. I had an examination made on the day following, and the fact was elicited that dead rats had been found on the wharf during the week or ten days preceding. A bacteriological examination of some of the rats found on the morning of the 23d showed them to be infected with plague.

The history of the case of human plague shows that the man, a contract laborer of the Panama Railroad, employed in handling freight on the wharf, not on the ships, who had been in La Boca for 3 months, was taken sick on June 15 and was treated in the barracks until June 21, when he became worse and was sent to the hospital on account of fever and a large bubo in the femoral region. Admitting that the patient was suffering from plague from the 15th, although from the course of this disease I think it probable that at first he was suffering from some minor ailment and plague did not develop until the 18th or 19th, we have the fact established that the rats on the wharf had become infected with plague prior to the appearance of the disease in the man. It is plain that the man contracted the plague in one of two ways--either by handling a dead plague rat when he had abrasions on his hands, or by acquiring the infection by walking with bare feet over a portion of the wharf that had been infected by the sick or dead rats. A possible source in this case may have been the infection of his food by soiled hands infected as above mentioned. It is clear that a limited or special application of infection only can be considered; that handling infected cargo must be debarred, because if such was the cause more than 1 case would have developed simultaneously or near each other in occurrence, and the men handling cargo on the ship would not have escaped.

In considering how the La Boca wharf became infected, the fact that the rats contracted plague, and thereby infected the wharf has been established. Now, how did the rats acquire the disease? Accepting as a fact that plague is introduced into a new place nearly always either by infected rats and vermin or by infected cargo, we must naturally look to one of these causes as operative in the case under consideration. Either one or two infected rats on the ship escaped destruction by the double fumigation and gained access to the wharf, dying there and infecting the rats on the wharf, or some limited amount of infected cargo was brought, and by eating the same the rats acquired the disease. To establish the latter we must assume that the infected cargo was limited in amount, because infected rats have not been found elsewhere, as would have been the case if large quantities of such cargo had gained entrance. In the congested state of traffic on the isthmus cargo often remains either in Panama or Colon for some time.

In my opinion the disease was introduced either by one or two infected rats on the ship that had escaped death from fumigation, gaining access to the wharf and infecting the rats there present, or that the rats from the wharf became infected by eating some limited amount of infected food either on the wharf or the ship. I think the first most probable.

#### QUARANTINE MANAGEMENT.

The patient having died on June 23 and the necropsy showing quite strongly that plague was in all probability the cause of death, measures were immediately taken to ascertain the source and extent of the infection.

Asst. Surg. C. C. Pierce was sent to La Boca to investigate conditions, and he found that as the rats were dying on the wharf this at least was one center of infection. An inspection of the contract laborers showed that no others were suffering with suspicious symptoms.

The sanitary control of the La Boca district was temporarily transferred to this Office, on account of the conditions at La Boca being intimately connected with the quarantine service.

On June 24 Doctor Pierce was ordered to La Boca to assume immediate charge of disinfection and sanitation of this district. Dr. Taylor E. Darby was ordered from Colon as an assistant, and disinfection and a house-to-house inspection were instituted. On this date a quarantine was placed on the wharf. This structure was disinfected by thoroughly washing down with 1:1000 bichloride of mercury solution. The office building on the wharf, in which 5 dead rats were found on the morning of the 23d, was fumigated with 5 per cent sulphur gas for six hours to destroy vermin, and was then thoroughly washed down with solution bichloride of mercury 1:1000. The house in the camp from which the case was removed and the adjacent buildings were also disinfected in a similar manner during the day, and 100 rat traps and poison were placed on the wharf and the 2 vessels alongside at night.

On the morning of June 25 the two vessels alongside the wharf were remanded down the bay and fumigated with sulphur gas on the day following. La Boca wharf was closed.

It was evident from the beginning that the entire town of La Boca should be quarantined, thoroughly inspected, and disinfected, but as there were about 500 persons working at La Boca who lived elsewhere, some provision for furnishing quarters and food for them had to be made. This work was pushed, and on the day following, June 26, arrangements having been completed, a quarantine against the entire town was put into effect, and all communication was stopped except that which was absolutely necessary and under the supervision of the quarantine officer and the police. The Canal Zone police were intrusted with the maintenance of this quarantine, and a double cordon, including water patrol, made this effective. The quarantine was rigid and much credit is due the police for the efficient manner in which it was carried out.

On June 27, provision having been completed for caring for the people detained in quarantine, and all the contract laborers, those that might possibly be taken sick with plague being isolated in quarantine at La Boca, the work of disinfection was prosecuted with vigor, and all the painters, carpenters, and stragglers were put to work in fumigation squads.

The plan of disinfection was uniform and consisted in a preliminary disinfection with 5 per cent sulphur gas for 6 hours for the purpose of destroying all vermin, a matter of paramount importance in dealing with plague infection; then the house was immediately disinfected by thoroughly washing the floors, walls, and ceilings with 1:1000 bichloride of mercury solution, applied by means of a force pump; in fact, the walls of the buildings were practically saturated with this solution. All soiled clothing and dirty bedding found in the house were dipped and thoroughly wetted with this solution and placed in the sun to dry. The measures in the camp where the contract laborers lived and from which the case was taken and the adjacent house were even more drastic, as all clothing and bedding were thoroughly wetted with

bichloride solution irrespective of condition. All these houses, as well as the wharf, 1,000 feet long and 45 feet wide, were redisinfected every seven days.

The disinfection was under the control of the disinfectors of the quarantine service, the one from Colon having been ordered to La Boca to assist, and was done under the personal direction of the medical officers stationed there, as outlined by me in my daily trips to La Boca for the purpose of inspecting and directing the work.

In the meantime the campaign against rats was not neglected, and certain employees were designated for this special work.

A house-to-house inspection was made twice daily, and cases of sickness were seen immediately and carefully examined.

On June 27, 1 case regarded as suspicious was taken to the detention house and isolated, but it proved not to be plague. A necropsy was made on the body of a child that died on the night of the 26th, but it was not a case of plague, death having been due to pernicious malarial fever.

The disinfection of all the houses of the camp and of the section adjacent, 52 in number, was completed at noon June 29, and work was immediately started on the village proper.

The work of disinfecting the houses in the village, 76 in number, was completed on July 1.

The work of fumigation and disinfection was slow; still all the houses in the town, 128 in number, had been doubly disinfected by fumigation with sulphur for six hours and washed down with bichloride solution, including disinfection of clothing and bedding, in the short time of five days, with a limited force of laborers. At the same time considerable work had been done in general cleaning of yards and premises, especial attention having been given to clearing away all rubbish under the houses.

Upon completion of the disinfection, the premises under and around all the buildings in the town were thoroughly cleaned, all rubbish and garbage was carted away, and large quantities of carbolic acid and chlorinated lime were distributed under the houses, in damp places and drains. All coops for fowls and animals and small outbuildings built as annexes to the houses were torn down and burned. Boards and platforms used as walks or standing places were taken up and replaced, so elevated from the ground as not to be a hiding and nesting place for rats and mice. All tall grass, weeds, etc., were removed from yards and walks, and the drains were opened.

Every house and structure in La Boca had been thoroughly disinfected and some of them redisinfected by the night of July 1. The town was then considered clean, and the quarantine proper, to show if other cases of plague would develop, commenced. This quarantine of elimination could not be considered until every possible center of infection had been vigorously treated in an effort to eradicate the infection.

On July 15, fourteen days having elapsed since every structure in the town had been disinfected and no new or suspicious cases having occurred, the quarantine was removed.

In the management of this quarantine I have been guided by the principle that the time to control a threatened epidemic is when it is in its incipiency; that the most energetic and stringent measures are justifiable and should be employed, and that the more rapidly efficient work is done the greater the prospects of stamping out the infection.

The work accomplished is recapitulated as follows:

People (residents) detained .....	897
People (not residents of La Boca) placed in camp and other quarters and detained .....	476
Houses disinfected with sulphur and bichloride of mercury .....	128
Houses fumigated with formaldehyd .....	5
Houses refumigated and disinfected .....	13
Houses washed down weekly with bichloride of mercury solution 1:1,000 (and the La Boca wharf) .....	10
Rations issued .....	7,930
Rats destroyed (up to July 15) .....	475

(Rat destruction is being continued.)

In conclusion, I invite attention to the fact that we are in constant danger of reintroduction of plague, that the importance of freeing Panama from rats can not be overestimated, and that this matter should receive the most energetic prosecution.

#### PHILIPPINE ISLANDS.

*Reports from Manila—No quarantinable diseases—Treatment of leprosy at the San Lazaro Hospital.*

Chief Quarantine Officer Heiser reports, August 8, 11, and 17, as follows:

During the week ended July 29, 1905, there were no quarantinable diseases reported for the city of Manila.

*Leprosy.*—Experiments in the treatment of leprosy by the X ray have been conducted at San Lazaro Hospital for a number of months.

In the fall of 1904 a male adult was treated during a number of weeks. He had infiltrations of the left ear and nodules in the cheeks, and after a number of treatments he showed marked signs of improvement. The affected ear measured before treatment about 4 inches in its long axis, and after treatment it was reduced to its normal size, which was about  $2\frac{1}{2}$  inches. Coincident with this the other symptoms of leprosy disappeared, and it was no longer possible to find the leprosy organism in scrapings taken from the skin. In the spring of 1905 he showed evidences of being afflicted with some chronic disease, and died during the early part of July. A careful post-mortem examination was made, which showed that death was in all probability due to atrophy of the liver. Sections of tissue were removed from both superficial and deep structures, and after being properly stained were examined for leprosy bacilli, but with negative results. The pathologist of the bureau of government laboratories reported that he was unable to find leprosy bacilli in sections of the skin taken from the same place at which undoubted organisms had been found upon his entrance to the hospital. A number of other lepers have also been treated with the X ray, many of whom have shown marked improvement. Two of them have progressed so far that it is no longer possible to detect leprosy bacilli in scrapings from the skin.

During the week no vessels cleared for ports of the United States.